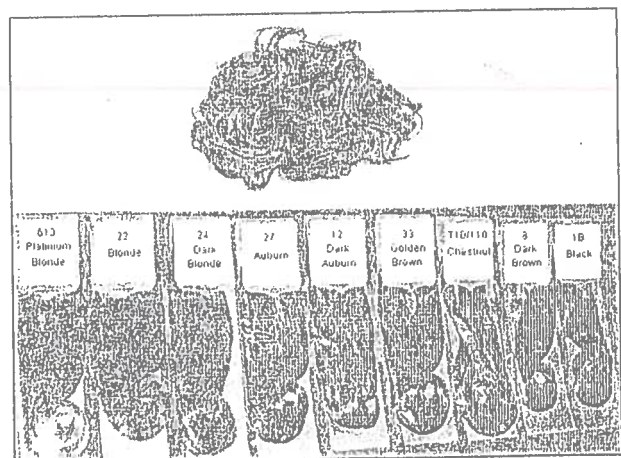


### Wigs, Hair pieces & Camouflages

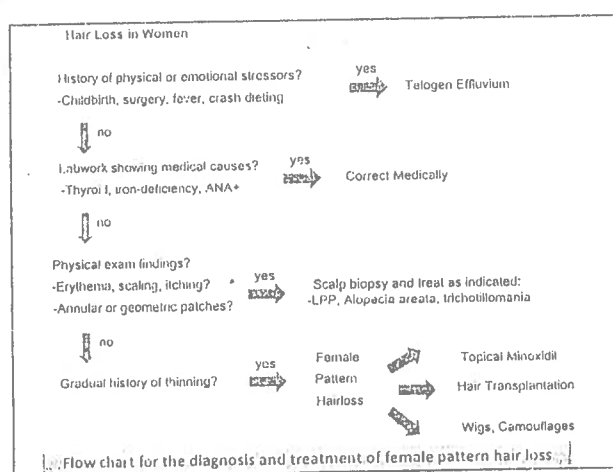
- Useful for patients who can not achieve sufficient hair density with medications and / or surgery.
- No medical side effects.
- Patients can freely change their hair style.
- Use of natural or synthetic hair fibers.
- Camouflage the areas of thinning scalp by various topical sprays or powders.




## Conclusion

- Patients frequently feel confused with the multiple options for treating hair loss.
- Dermatologists can help them to choose the best option for them.
- MINX & finastride remain the best agent in treatment of hair loss, the most effective in clinical practice & supported by literature, at least 6 – month overlap.

- No guarantee that patients will not experience a telogen eff. when switching from one treatment to another.
- Treatment of male and female pattern hair loss is different.
- Diagnosis in male is straightforward.
- Diagnosis in females require considerable history and physical exam.



Thank You



## Anagen Effluvium

By

**Ahmed Sadek**

Professor of Dermatology  
Anthology & Venereology

### Three phases of growth cycle

#### Anagen phase

- Growing phase
- Vigorous mitotic activity(matrix cells)
- Have long indented roots
- Intact sheaths
- Fully pigmented , at the end of the phase pigment decreases
- 1000 days

#### Catagen phase

- Transitional phase
- Mitotic activity decreases
- The follicle separates from the dermal papilla & capillary plexus
- Moves upward within its sheath
- Few days

#### Telogen phase:-

- Resting phase
- Club hairs (short , club shaped roots)
- Lack root sheaths
- Depigmentation of the proximal part of the shaft
- 100 days
- 10-15%

در صلب العاقل

## التهربع دعامات حاج تبرز

### Dystrophic anagen

- State in which anagen phase become inflamed and unable to produce hair fibre of significant size or integrity

### Nanogen follicles

- Intermediate stage between terminal & vellus anagen

### Exogen

- Hair cycle event describes the controlled shedding club hair fibres

### Kenogen

- A state in alopecia in which exogen occurs before renewed anagen growth, leaving a hair follicle without visible hair fibre

### Anagen effluvium

- Diffuse hair loss in which the hairs shed in the anagen phase
- Types of anagen effluvium
  - 1) Loose anagen hair
  - 2) Dystrophic anagen effluvium

### Loose Anagen Hair Syndrome

- A disorder of anagen hair anchorage to hair follicle, with ability to easily & painlessly pull out large number of anagen hairs from the scalp
- First described in 1986
- Occurs more in fair-haired girls, 2-9 years
- Autosomal dominant

### Clinically

- Predominantly described in children
- Often recedes with age
- Can be seen in adulthood
  - Continuation of the disorder
  - Late onset anagen hair syndrome
  - Similar changes associated with AIDS (AIDS trichopathy)
- Variation in hair texture, dry, lusterless, with uneven ends, diffuse thinning, focal areas of alopecia

النظر  
في  
اللوحة  
التي  
تحتوي  
على  
الصور

*crick of IRS*

### Pathogenesis

- Disturbance of cellular adhesion between the hair cuticle and IRS
- Aberrant keratinization of IRS
- Traction separates the hair from IRS
- IRS remains attached to the follicle

### H/P study

- Abnormal clefting between IRS & hair shaft
- Premature keratinization & degeneration of IRS
- Poor cohesion of the cells of IRS
- Ultrastructural study show longitudinal grooves of hair shaft

### DD

- Alopecia areata
- Telogen effluvium
- Pili torti
- Uncombable hair syndrome

### Management

- Reassurance, improves in mid to late teens
- Look out for associated features like hypohidrotic ectodermal dysplasia

### Dystrophic Anagen Effluvium

- Shedding of large number of hairs from the anagen phase of growth.

#### Aetiology:-

Antineoplastic drugs (chemotherapy induced alopecia CIA)

- Busulphan (most common implicated agent)
- Cyclophosphamide
- Thiotepa
- Melphalan
- Etoposide
- Carboplatin
- Docetaxel
- Paclitaxel

### Radiation induced alopecia

- Environmental or occupational exposure to toxin (toxic alopecia)
- Alopecia areata ( inflammatory insult to the matrix)
- Uncommon symptom of pemphigus vulgaris , due to auto Ab to desmosomal ptn. in follicular epith. , cleavage causes AE in lesional & perilesional areas.

### Radiation induced Alopecia

- Reversible or permanent.
- Permanent alopecia occurs with > 30 GY of deep X-rays or >50 GY of soft X-rays
- Radiation -induced temporary epilation may follow neuroradiologically guided embolization procedures.

### Toxic Alopecia

- Exposure to hazardous chemicals , toxic metals of the environment .
- Many heavy metals ( Thalium , mercury , arsenic , copper , cadmium , bismuth ) disrupt the formation of hair shaft through binding to sulfhydryl groups of keratin .
- Copper intoxication may be related to ingestion of tap water containing a high conc. Of copper salts.
- Dental amalgam (mercury)

## Chemotherapy induced Alopecia (CIA)

- The morbidity of CIA should not be underestimated .
- Usually reversible , permanent alopecia is rare.

### Pathophysiology:-

- Chemotherapy targets replicating cells within hair matrix (high mitotic & metabolic activity)
- Inhibition or arrest of cell division lead to a narrow weakened segment of hair shaft.
- Susceptible to fracture with minimal trauma.
- Can result in complete failure of hair formation.
- High dose or repeated chemotherapy could induce telogen eff. Beside AE with delay in hair regrowth.
- More common and severe with combination therapy.
- Severity also depends on route , dose , frequency & individual variation for the bioavailability of the drug.

## Clinically

- History of exposure to drugs
- Hair loss usually begins 7-14 days after , most apparent after 1-2 months .
- Grading of hair loss (WHO criteria)
  - Grade 0 = no loss
  - Grade 1 = mild hair loss
  - Grade 2 = pronounced or complete

### Examination revealed:-

- Non scarring alopecia with intact follic. Ostia.
- No signs of inflammation
- Affects the scalp (more on the crown) , eye brows , eye lashes and body hair.

### Differential Diagnosis.

- Telogen eff.
- Androg. Alopecia
- Traction alopecia
- Trichotillomania
- Alopecia areata
- Alopecia mucinosa
- Tinea capitis
- Atopic D
- Pemphigus vulgaris
- Psoriasis



### Other problems to be considered

- Hypo & hyperthyroidism
- Hypopituitarism
- Diabetes
- Sezary syndrome
- Lymphoma
- Ptn. malnutrition
- Iron deficiency
- Collagen disease
- Endocrine and metabolic disorders
- Syphilis
- Wide spread skin diseases

### Pull test

- By firm grasping of about 40 hairs between thumb & forefinger and slowly pull on them.
- Presence of tapered fractures of the shaft is diagnostic of AE.

### Histologic changes

- Horizontal sections
- 4 mm punch biopsy contains 25-50 follicles
- Normally < 15 % of the follicles are in telogen phase.
- Normal Anagen to telogen ratio is characteristic of AE.
- No signs of inflammation.

### Treatment.

- Minoxidil shortens the period of baldness by about 50 days.
- Scalp cooling with cold air or liquid.
- Application of a pressure cuff around the scalp and local hypothermia
- ❖ Hinder the delivery of medication to the scalp.
- ❖ Not suitable in patients with leukemia , lymphoma and other hematologic malignancy

- Medical corrective preparation makeup to camouflage eye brow alopecia
- In rodent models , localized administration of heat or subcut./intradermal injection of geldanamycin induced stress ptn. response in hair follicles & prevented CIA



### Prognosis

- Reversible with hair regrowth after 3-6 months.
- Permanent alopecia is rare with CIA.
- In some cases, hair regrows despite continued or maintenance therapy.
- Occasionally, colour & texture of regrowed hair after chemotherapy is different.

### Patient education.

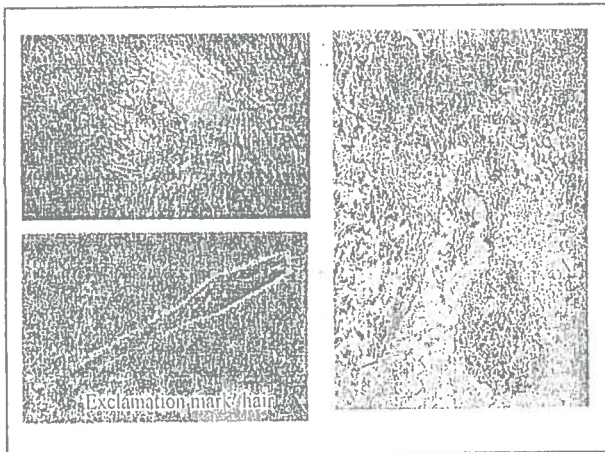
- CIA can be psychologically devastating to the patient.
- Patients have even refused life-saving treatment.
- Other medications can cause AE.
- Reassured that hair loss is temporary.

### Permanent CIA

- Absence or incomplete hair regrowth 6 months after completion of chemotherapy.
- Irreversible, non scarring
- Rare
- First described in 1991 following chemotherapy & subsequent bone marrow transplantation (BMT)
- BMT usually indicated in hematological malignancies.
- Few reports of CIA without bone marrow transplantation
- Incidence 0.9 – 43 %

### Described following therapy with:-

- Busulphan
- Cyclophosphamide
- Thiotepa
- Melphalan
- Etoposide
- Carboplatin
- Docetaxel
- Paclitaxel

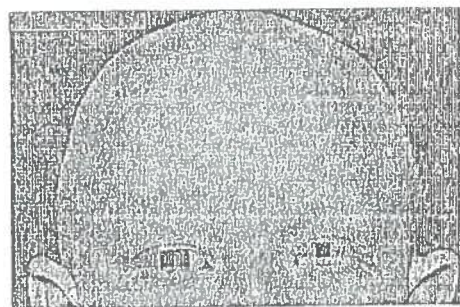


### Hair transplantation

- Useful adjunct to hair transplant surgery for AGA.
- Perioperative, prevent the usual shedding (1 – 2 weeks) & speed the time for regrowth from 6 -8 months to 1-2.
- Used for 6 w before & 17 w after.
- Should be stopped 2 – 3 days before surgery to minimize irritation and risk of bleeding.
- Restart again 1 – 2 w after surgery.
- Better efficacy with 5% concentration.

### Chemotherapy-induced alopecia

- A randomized, double blind study of breast cancer patients using 2%.
- Used during the course and 4 months post chemotherapy.
- 50% decrease in Alopecia.



## Telogen Effluvium

By

**Ahmed Sadek**

*Professor of Dermatology & Venereology*

- Syn. Telogen defluvium
- First coined by Kligman in 1961
  - Loss of club hair in disease states of the follicle
- Type of diffuse hair shedding associated with diffuse alopecia
- Other causes include ; anagen eff. and early AGA

## Normal hair cycling

- Follicular cycling within anatomical region is synchronous in infancy producing moult wave
  - Moult wave persists in many animals
  - In human synchronous hair growth disappears in childhood
  - Scalp hair growth is cyclical in manner
  - Each hair follicle undergoing 10-30 cycles in a life time
- Anagen (growth phase) 2-8 ys
  - Catagen (involution phase) 2-3 weeks
  - Telogen (resisting phase) 2-3 months
  - Exogen (release of the dead hair) may coincide with the end of telogen , club hair released 4-6 weeks after the onset of anagen
  - 100,000 hairs on the scalp
  - Normally 10-15% are in telogen
  - Shedding of 100-150 telogen hairs/day is normal
  - Anagen hair loss is never normal

## Pathogenesis

- Headington (1993) described 5 functional types of TE based on different phases of follicular cycle

- 1) Immediate anagen release
- 2) Delayed anagen release
- 3) Short anagen syndrome
- 4) Immediate telogen release
- 5) Delayed telogen release

### Immediate anagen release

- Short onset effluvium
- Follicles are stimulated to leave anagen and enter telogen prematurely
- Increased hair shedding at the end of telogen
- Common with severe illness and drug induced hair loss

### Delayed anagen release

- The cause of post partum hair loss
- During pregnancy , hairs remain in prolonged anagen
- Post partum telogen conversion leads to increased shedding some months later

### Short anagen syndrome

- Idiopathic shortening of the duration of anagen
- Can cause a persistent TE in some individuals

### Immediate telogen release

- Results from shortening of normal telogen
- Release of club hairs as the follicles are stimulated to re-enter anagen
- Drugs(minoxidil) can precipitate immediate telogen release

### Delayed telogen release

- Occurs after prolonged telogen followed by transition to anagen
- Occurs in animals with synchronous hair cycles during shedding of their winter coats
- May occur seasonally in some humans

### •TE can be divided into :-

- Acute
- Chronic
- Chronic – repetitive

### Acute TE

- Acute onset
- Less than 4-6 months
- Triggers such as high fever , surgical trauma , sudden starvation or haemorrhage
- 33% no identified trigger
- Evidence for emotional stress as a cause is weak

- Pathogenesis : immediate anagen release
- Unless the trigger is repeated , spontaneous complete regrowth within 3-6 months
- The degree of hair loss depends on the duration and severity of the course in addition to individual variation in susceptibility

- Most cases of telogen gravidarum resolve , small proportion experience persistent episodic shedding that may be diffuse or localized
- Similar state occurs after discontinuation of contraceptive pill
- Telogen gravidarum is an example of delayed anagen release

### Chronic TE

- Insidious onset
- Due to prolonged or repeated insult
- Hair shedding persist for more than 4-6 months
- Chronic TE can be primary or secondary

- To be a true cause , the relationship between the trigger and hair loss must be reversible & reproducible
- Examples include :- thyroid disorders , iron deficiency anaemia , malnutrition & acrod. enteropathica

Chronic TE

## Triggers of TE

### Hormones

- Discontinuation of oral contraceptives
- Taking oral contraceptives with androgenic progestones
- Replacement therapy with high dose progestones
- Chronic TE with prolonged breast feeding associated with decreased estrogen, increase in prolactin level

## Thyroid

- 50% with hyperthyroidism
- 33% with hypothyroidism
- The mechanism is unclear
- Reversible when euthyroid states is restored
- Long standing hypothyroidism, the hair follicles may be atrophied

*M. Onai*

## Nutritional influences

- Nutritional deficiencies may be due to diseases, prolonged breast feeding, parental alimentation, vegetarian diets, healthy diets
- Iron storage anemia
- Caloric deprivation (starvation diets)
- Rapid wt. loss
- Vitamins, minerals and protein deficiencies
- TE occurs 4-6 months after initiation of such diet

## Anaemia

- Iron deficiency is the world's most common nutritional deficiency
- Hb concentration is a screen for iron deficiency
- Ferritin used to confirm iron storage deficiency



- TE, diffuse pattern hair loss & alopecia areata can be related to iron & iron storage deficiencies
- Iron supplements & iron containing foods is helpful adjuvant therapy
- With iron supplements , monitoring iron initially every 6-8 weeks then every 6 months

- Upper limit for iron intake for 18 ys & older is 45 mg/d
- Major side effect of iron overload
  - *Tissue damage & fibrosis*
  - *Exacerbate hemochromatosis*

## Zinc deficiency

- Can present as alopecia and TE
- Can be acquired or hereditary
- Excessive iron supplementation and vit A deficiency can cause zinc deficiency
- Low serum zinc level
- Zinc supplementation is the therapy of choice

- Above normal value of zinc can result in copper, iron & calcium deficiencies , GIT reactions , headache & drowsiness
- Oral zinc supplement has also antiinflammatory effect , assist iron absorption and antiandrogen

### • Daily requirement

- *5-8 mg/day for children*
- *15mg/day for adult*

### • In zinc deficiency

- *0.5-1 mg of elemental zinc /kg/day for infants & children*
- *25-50 mg/day of elemental zinc for adult*

## Vitamin A & TE

- Plays an important role in cell maturation and differentiation and the immune system
- Deficiency & hypervitaminosis A can lead to TE
- Provitamin A & carotenoids are safe
- Upper limit for tolerable intake
  - *Less than 2000 IU/day for children*
  - *Less than 10,000 IU/day for adult, pregnant and lactating females*

## Biotin deficiency & TE

- Essential vit. That complements nail & hair growth
- Deficiency can lead to alopecia, dermatitis, neurological disorders & recurrent infections
- Recommended daily dose
  - *0.05-0.3 mg/day for infants & children*
  - *0.3 mg/day for adults and lactating females*
  - *In biotin deficient adults, 1-5 mg/day*

## Vit D & TE

- Vit D deficiency can induce follicular cycling alteration in mice and animal models
- Vit D3 supplements initiate hair follicle cycling and stimulate hair growth in mice
- Vit D3 supplementation could be a supportive adjunctive therapy in TE

- Topical calcipotriol has no effect on TE
- Recommended daily allowance
  - 400 IU/day for children , adults and pregnant females

#### Protein and restricted calories and TE

- Induced TE and alopecia
- Later lead to diminished size and density of hair follicles and reduced hair diameter
- Chronic deficiencies result in sparse , fragile , fine & light colored short hair
- Protein supplements and supportive calories will improve quality of hair and promote growth

#### Fatty acids & TE

- Lead to skin & hair changes
- Dry , fragile & light colored hair and TE
- Can be associated with dermatitis especially of the scalp & eye brows
- Supplements reversed TE

#### Systemic disorders and TE

- Autoimmune diseases
- Acute and chronic systemic infections
- Inflammatory bowel disease
- GIT disorders
- Febrile episodes
- Acute and chronic illness
- Lymphoproliferative disorders

## Surgery and TE

- The etiology of postoperative TE is multifactorial and includes
  - *Surgery procedure*
  - *Surgical events*
  - *Drugs*
  - *Hypotension*
  - *Metabolic stress*

## Drugs – botanical supplements and TE

- Many drugs and fewer herbals – supplements can induce TE & alopecia
- Careful histories about drugs is important in patient with TE
- If the initiating drug is discontinued a reversal of TE is expected

## • Examples of drugs that can induce TE & alopecia

- *Androgens*
- *Anticoagulants*
- *Anticonvulsants ( altered or reduced zinc & selenium )*
- *Antidepressants*
- *Antifungal such as ketoconazole & fluconazole in high doses*
- *Antiinflammatory drugs ( prolonged use of NSAIDS)*

- *Antimitotic drugs used in cancer or as a immunosuppressive in high dose induce anagen effluvium & in low dose induce TE*
- *Angiotensin converting enzyme inhibitors (binding of zinc) and reversible with zinc supplement*
- *B-blockers*
- *Estrogen antagonists ( inhibit estrogen action on dermal papilla)*
- *Heavy metals*
- *Hypervitaminosis A*

- *Topical minoxidil can initiate TE which resolve in several months*
- *Statin which reduce cholesterol*
- *Sulfasalazine*

### Scalp inflammation & TE

- Seborrheic dermatitis , ps. and contact dermatitis of the scalp induced TE , trichodystrophies and follicular miniaturization
- Severity of seb.D correlates with severity of TE

- Antidandruff shampoos represents the most common therapeutic agents
- Ketoconazole and zinc pyrithione can partially reverse TE and enhance hair growth
- Other effective therapies
  - *Pimecrolimus 1% cream*
  - *Oral fluconazole 50 mg /day /2 weeks*
  - *Oral terbinafine 250 mg/day/6weeks*

### Diagnosis

#### 1)History

- Duration of hair shedding
- Episodic or continuous
- Estimation of % of hair lost
- Identification of triggers
- History of recent surgery , fever , illness , child birth & psychological stress
- History of chronic disease , malignancy , infection , autoimmune disease , liver & renal diseases

- Menstrual history
- Hair care procedures
- Dietary history and wt loss noted
- Family history of autoimmune disease and thyroid disorders
- Medication including over-the-counter drugs and botanicals
- History of heavy metal exposure

## 2)Examination

- Inspection: visual , wood's light or by dermoscopy or videodermoscopy
- Inflammation , erythema and scaling , infection
- Hair collection , hair pull , hair clipping , hair pluck

## • Nail examination

### • Scalp biopsy :-

- *Increase the proportion of follicles in telogen*
- *Anagen : telogen ratio 8 : 1 (normal 14:1)*
- *Terminal to vellus hair as in normal (8:1)*
- *In androgen.A (1.9:1)*

## 3)laboratory workup

- CBC
- CMP
- Serum ferritin level
- TSH ,T4 , microsomal Ab
- Serum zinc level
- Serum vit.D 25 hydroxylase

## Treatment

- Education and explanation to the patient their condition
- Remove the trigger and treat it ( shedding will settle , but can continue for up to 6 months )
- In acute TE , if the trigger is removed , the shedding is short lived and no further treatment is required

- Treat scalp inflammation and diseases
- Replace nutritional deficiency
- Treat thyroid disease if present

- Treat underlying systemic illness or infection
- Biotin and zinc replacement can support hair regrowth
- Topical hair growth promotor , minoxidil 2% or 5%

